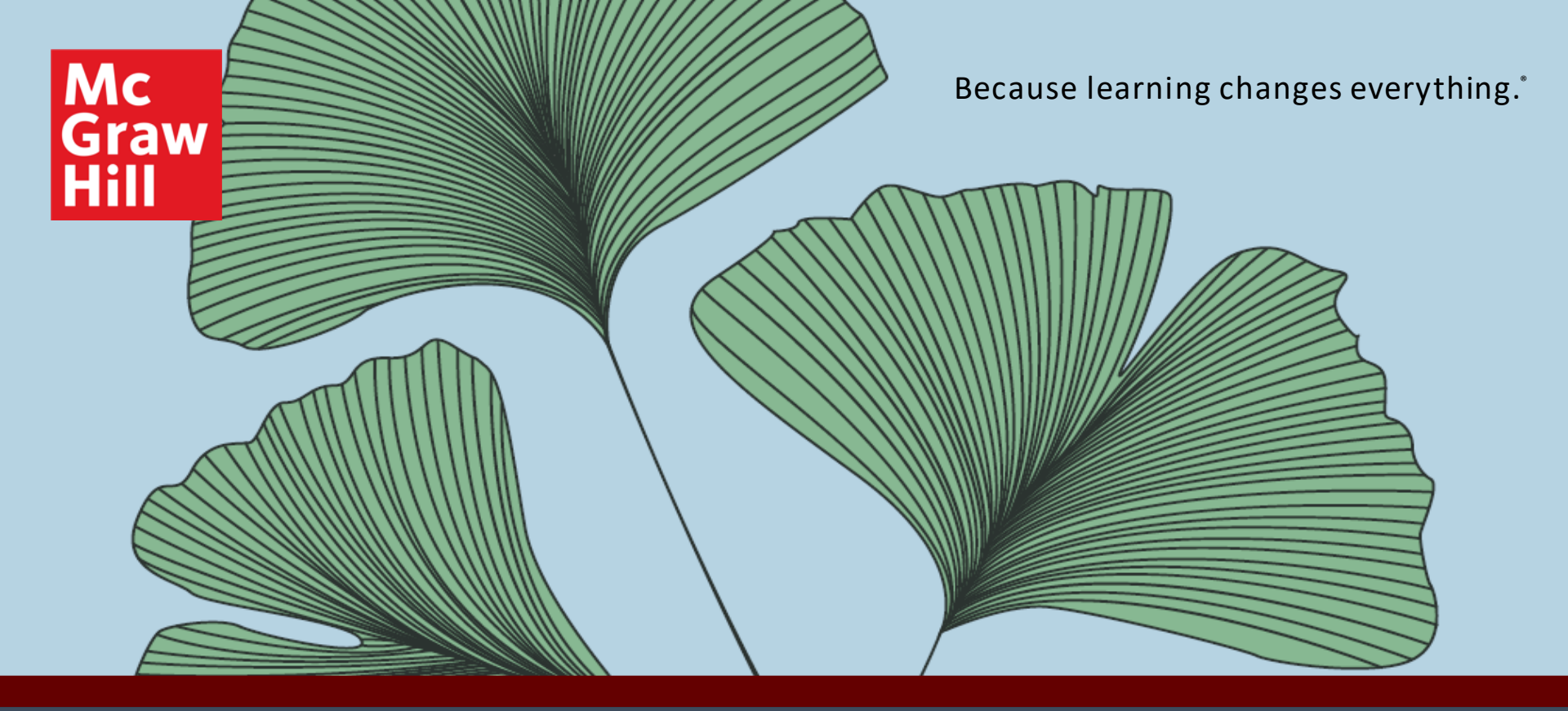

Because learning changes everything.®

Chapter 8

Money, the Federal Reserve, and Global Financial Markets

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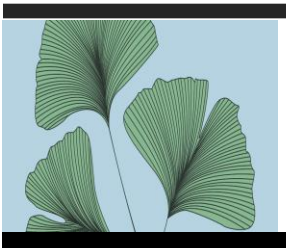

Learning Objectives 1

1. Discuss the three functions of money and how the money supply is measured.
2. Analyze how the lending behavior of commercial banks affects the money supply.
3. Describe the structure and responsibilities of the Federal Reserve System.

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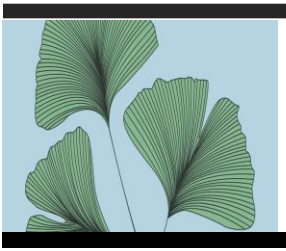

Learning Objectives 2

4. Describe the role of financial intermediaries such as commercial banks in the financial system and differentiate between bonds and stocks.
5. Show how the financial market improves the allocation of saving to productive uses.
6. Analyze the factors that determine international capital flows to understand how domestic saving, the trade balance, and net capital flows are related.

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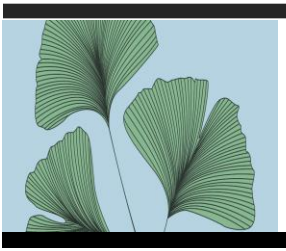

Money

Money is any asset that can be used in making purchases.

- Examples include coins and currency, checking account balances, and traveler's checks.
- Shares of stock are not money.

Money has three principal uses.

1. **Medium of exchange** an asset used in purchasing goods and services
2. **Unit of account** a basic measure of economic value
3. **Store of value** an asset that serves as a means of holding wealth

Money makes barter unnecessary.

- **Barter** is trading goods directly.

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Private Money

Money is usually issued and controlled by the government.

Private money can develop in certain circumstances.

An Ithaca Hour is worth $10, the average hourly wage of workers.

- 1,600 individuals have earned and spent this currency.
  - Encourages local shopping.

Bitcoin virtual currency.

- Obtained through “mining,” or in exchange for other currencies, products, and services.
- The price of Bitcoins is significantly volatile.

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Measuring Money, January 2020

- Definitions of money range from narrow to broad.

M1		**3,951.3**
Currency	1,717.7	
Demand deposits	1,564.2	
Other checkable deposits	669.4	
M2		**15,432.2**
M1	3,951.3	
Savings deposits	9,908.7	
Small-denomination time deposits	582.1	
Money market mutual funds	990.1	

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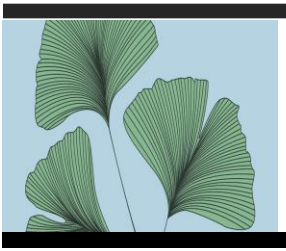

Commercial Banks Create Money

Republic of Gorgonzola begins with no banking system.

- Government issues 1 million guilders.
- Banks are created to store cash.
  - Payments are made by withdrawing cash or writing checks.
    - Checks tell bankers of change in ownership of the specified number of guilders.
- Without interest, banks earn profits by charging depositors fees.

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Consolidated Bank Balance Sheet – Part 1

All guilders (g) are deposited.

Assets		Liabilities	
Currency	1,000,000 g	Deposits	1,000,000 g

Bank reserves are cash or similar assets held by banks.

- Used to meet depositors' withdrawals and payments.
- Gorgonzola's banks have 100% reserves.
  - **100 percent reserve banking** is when banks' reserves equal 100 percent of their deposits.

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Bank Reserves 1

Cash in a bank's vault is not part of the money supply.

- Unavailable for payments.
- Bank deposits available for use in transactions are part of the money supply.

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Bank Reserves 2

Bankers realize that inflows and outflows from vaults leave some guilders unused.

- Only 10% of deposits are needed for transactions.
- 90% can be lent to borrowers for a fee – interest.

By making loans, they put more money into the economy, increasing the money supply.

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Consolidated Bank Balance Sheet – Part 2

Currency held in the vault is the bank reserves.

Assets		Liabilities	
Currency	100,000 g	Deposits	1,000,000 g
Loans	900,000 g		

The **reserve-deposit ratio** is bank reserves divided by total deposits.

Fractional-reserve banking system holds less bank reserves than deposits.

- The reserve-deposit ratio is less than 100%.

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Consolidated Bank Balance Sheet – Part 3

Farmers borrow 900,000 guilders to buy supplies.

- Farmers spend the 900,000 guilders which are then deposited in the banks.

Assets		Liabilities	
Currency	1,000,000 g	Deposits	1,900,000 g
Loans	900,000 g		

Bank deposits are the entire money supply.

- Loan of 900,000 guilders increased the money supply by 900,000 guilders.

Banks are again holding excess reserves on deposits of 1,900,000 guilders.

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Consolidated Bank Balance Sheet – Part 4

With deposits of 1,900,000 guilders and a reserve – deposit ratio of 10%, banks want only 190,000 guilders in reserves.

- Currently holding 1,000,000 guilders.
- Loan 810,000 guilders.

Assets		Liabilities	
Currency	1,000,000 g	Deposits	2,710,000 g
Loans	1,710,000 g		

- Loan are spent and re-deposited.
  - Excess reserves are created and re-loaned.

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Consolidated Bank Balance Sheet – The End

Expansion of loans and deposits stops when reserves are 10% of deposits.

- 1,000,000 guilders available as reserves.
- Deposits stabilize at 10,000,000 guilders.

Assets		Liabilities	
Currency	1,000,000 g	Deposits	10,000,000 g
Loans	9,000,000 g		

Beginning with 1,000,000 guilders in cash, the money supply is now 10,000,000 guilders.

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Money Creation

- With 10% reserves, each guilder supports 10 guilders in deposits.
- Deposits in the banking system satisfy this relationship.

$$\frac{\textbf{Bank reserves}}{\textbf{Bank deposits}} = \textbf{Desired reserve - deposit ratio}$$

- Solving for bank deposits we get.

$$\textbf{Bank deposits} = \frac{\textbf{Bank reserves}}{\textbf{Desired reserve - deposit ratio}}$$

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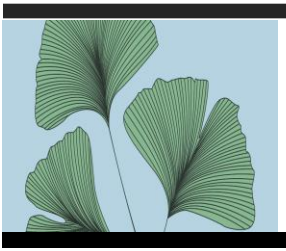

Money Supply with Currency and Deposits

Gorgonzola residents hold 500,000 guilders as currency.

- Deposit 500,000 guilders in the banks.
- Reserve-deposit ratio = 10%.
- Bank deposits = 500,000 / 0.10 = 5,000,000 guilders.
- Money supply = 500,000 cash + 5,000,000 deposits = 5,500,000 guilders.

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Money Supply at Christmas

Suppose banks hold $500 billion in reserves and the public holds $500 billion in cash.

- Reserve-deposit ratio = 0.20.
- Money supply = $500 + (500 / 0.20) = $3,000.

As Christmas approaches, consumers reduce bank deposits by $100 billion.

- Banks have $400 billion in reserves; public holds $600 billion cash.
- Money supply = $600 + ($400 / 0.20) = $2,600.

Reducing bank deposits reduces the money supply.

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The Federal Reserve

Central bank of the U.S.

Responsibilities of the Federal Reserve:

- Conduct monetary policy.
- Oversee and regulate financial markets.
  - Central to solving financial crises.

The Federal Reserve System began operations in 1914.

- Does not attempt to maximize profit.
- Promotes public goals such as economic growth, low inflation, and smoothly functioning financial markets.

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The Structure of the Federal Reserve System

12 Federal Reserve Bank districts.

- Assess economic conditions in their region.
- Provide services to commercial banks in their region.

Leadership is provided by the **Board of Governors**.

- Seven governors are appointed by the President to 14-year terms.
- President selects one of the seven as chairman for a four-year term.

The **Federal Open Market Committee** (FOMC) reviews economic conditions and sets monetary policy.

- 12 members who meet eight times a year.

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Controlling the Money Supply: Open-Market Operations

The Fed is the central bank of the U.S.

- Responsible for monetary policy and the oversight and regulation of financial markets.

Monetary policy is deciding and managing the size of the nation's money supply.

- Money supply is controlled indirectly.
  - **Open-market purchase** of government bonds from the pubic by the Fed increases bank reserves and the money supply.
  - **Open-market sale** of government bonds by the Fed to the public decreases reserves and money supply.

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Open-Market Operations 1

Open-market purchase: When the Fed purchases a bond from the public.

- Fed pays bond holder with new money.
  - The new money enters the economy.
  - The bond, which wasn't money, leaves the economy.
  - Receipts are deposited and this leads to a multiple expansion of the money supply.

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Open-Market Operations 2

Open-market sale: When the Fed sells a bond to the public.

- Bondholder pays with checking funds.
  - The checking funds, which were money, leave the economy.
  - The bond, which is not money, enters the economy.
  - Bank reserves decrease and this leads to a multiple contraction of the money supply.

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Increasing the Money Supply

An economy has 1,000 shekels in currency and bank reserves of 200 shekels.

- Reserve-deposit ratio = 0.2.
- Money supply = 1,000 + (200 / 0.2) = 2,000 shekels.

Central bank pays 100 shekels for a bond held by the public.

- Assume that all 100 shekels are deposited.
- Money supply = 1,000 + (300 / 0.2) = 2,500 shekels.
- 100 shekel increase in reserves leads to a 500 shekel increase in the money supply.

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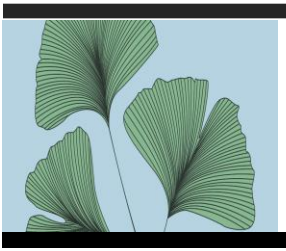

Stabilizing Financial Markets 1

Motivation for creating the Fed was to stabilize the financial markets and the economy.

Banking panics occurred when customers believe one or more banks might be bankrupt.

- Depositors rush to withdraw funds.
- Everyone tries to withdraw before the bank runs out of money.
- Banks have inadequate reserves to meet demand.
  - Banks close.

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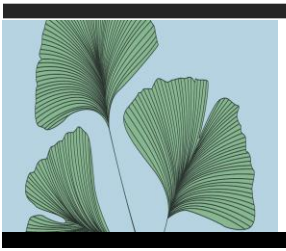

Stabilizing Financial Markets 2

Fed prevents bank panics by.

- Supervising and regulating banks.
- Loaning banks funds if needed.

Fed did not prevent the bank panics of 1930 – 1933.

- The Fed was more effective at preventing later panics.

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Bank Panics, 1930-1933 [1]

One-third of the banks closed.

- Increased the severity of the Great Depression.
- Difficult for small businesses and consumers to get credit.
- Money supply decreased.

With no federal deposit insurance, people held cash.

- Feared banks would close and they would lose their deposits.
- Holding cash reduced banks' reserves.
  - Lower reserves decreased the money supply by a multiple of the change in reserves.

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Bank Panics, 1930-1933 2

Banks increased their reserve – deposit ratio.

- Further decreased the money supply.

Date	Currency Held by Public ($B)	Reserve – Deposit Ratio	Bank Reserves ($B)	Money Supply ($B)
Dec. 1929	3.85	0.075	3.15	45.9
Dec. 1930	3.79	0.082	3.31	44.1
Dec. 1931	4.59	0.092	3.11	37.3
Dec. 1932	4.82	0.109	3.18	34.0
Dec. 1933	4.85	0.133	3.45	30.8

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Deposit Insurance

Congress created **deposit insurance** in 1934.

- Deposits of less than $250,000 will be repaid even if the bank is bankrupt.
  - Decreases incentive to withdraw funds on rumors.

No significant bank panics since 1934.

With less risk, depositors pay less attention to whether banks are making prudent investments.

- In the 1980s, many savings and loan associations went bankrupt.
- Fed can act as the lender of last resort.

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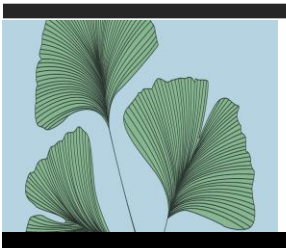

The Allocation of Saving

A successful economy allocates its saving to the most productive investments.

The interest on deposits is one important reason people put their saving in banks.

The banking system improves the allocation of saving:

- **Provides *information* to savers about the possible uses of their funds.**
- **Help savers *share the risks* of individual investment projects.**
  - Risk sharing makes funding possible for projects that are risky but potentially very productive.

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Banking System 1

Financial intermediaries are firms that extend credit to borrowers using funds raised from savers.

- Thousands of commercial banks accept deposits from individuals and businesses.
- They take these deposits and make loans with them.
- When loans are paid back, with interest, banks keep some of the interest and give some back to depositors.

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Banking System 2

Banks and other intermediaries specialize in evaluating the quality of borrowers.

- *Comparative Advantage.*
- Banks have a lower cost of evaluating opportunities than an individual would.
- Banks pool the saving of many individuals to make large loans, spreading out risk.

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Banking System 3

Banks gather information about potential investments.

- Evaluate the options.
- Direct saving.
- Service provided to depositors.

Banks provide access to credit for small businesses and homeowners.

- May be the only source of credit for some investments.

These loans earn interest.

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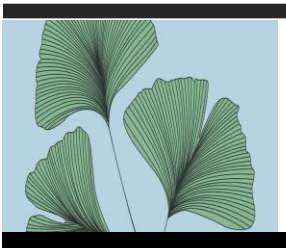

The Banking System

Having bank deposits makes payments easier.

- Checks.
- ATMs.
- Debit card.

Checks and debit cards are safer than cash.

Banks provide a record of your transactions.

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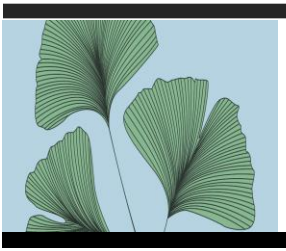

Bonds 1

A **bond** is a legal promise to repay a debt, usually including both the principal amount and regular interest, or coupon payments.

Each bond specifies.

- **Principal amount**, the amount originally lent.
- **Maturation date**, the date when the principal amount will be repaid.
  - The **term** of a bond is the length of time from issue to maturation.
- **Coupon payments**, the periodic interest payments to the bondholder.
- **Coupon rate**, the interest rate that is applied to the principal to determine the coupon payments.

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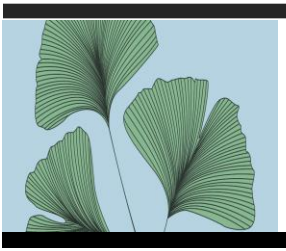

Bonds 2

Corporations and governments issue bonds.

The coupon rate depends on.

- The bond's term.
  - 30 days to 30 years; longer term, higher coupon rate.
- The issuer's credit risk.
  - Probability the issuer will default on repayment.
  - Higher risk, higher coupon rate.
- Tax treatment for the coupon payments.
  - Municipal bonds are free from federal taxes.
  - Lower taxes, lower coupon rates.

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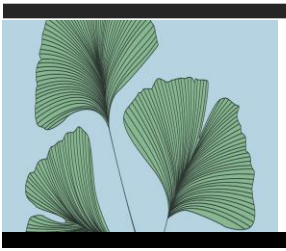

Bond Market

Bonds can be sold before their maturation date.

- Market value at any time is the price of the bond.
- Price depends on the relationship between the coupon rate and the interest rate in financial markets.

A two-year government bond with principal $1,000 is sold for $1,000, 1/1/20.

- Coupon rate is 5%.
- $50 will be paid 1/1/21.
- $1,050 will be paid 1/1/22.

Bond's price when sold depends on the prevailing interest rate.

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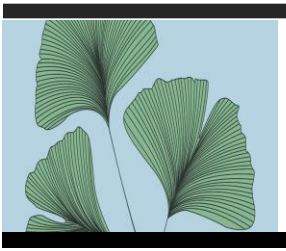

Selling a Bond 1

Offer for sale: one government bond with payment of $1,050 due in one year.

The competition: a new one-year bond with principal of $1,000 and coupon rate of 6%.

- Pays $1,060 in one year.

Year-old bond with 5% coupon rate is less valuable than the new bond.

- Price of the used bond will be less than $1,000

$$(\text{Bond price})\ (1.06) = \$1{,}050$$

$$\text{Bond price} = \$991.$$

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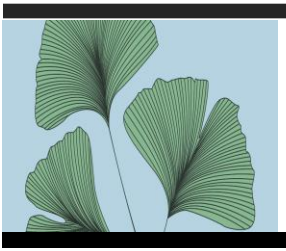

Selling a Bond 2

- **Bond prices and interest rates are inversely related**.
- Higher interest rates.
  → the new bond pays more
  → the old bond is worse by comparison
  → the old bond sells for less

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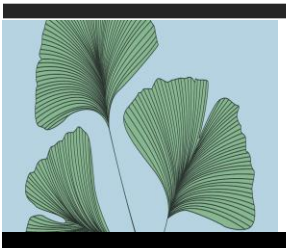

Stocks

A share of **stock (or equity)** is a claim to partial ownership of a firm.

- Receive **dividends**, a regular payment received by stockholders for each share they own.
- Receive *capital gains* if the price of the stock increases.

Prices are determined in the stock market.

- Reflect supply and demand.

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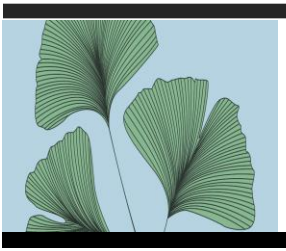

FortuneCookie.com

New company with estimated dividend of $1 in 1 year.

- Estimated selling price of stock will be $80 in 1 year.
- Interest rate is 6%.

Value of the new stock is $81 in 1 year

$$(\text{Stock price})\ (1.06) = \$81$$

$$\text{Stock price} = \$76.42.$$

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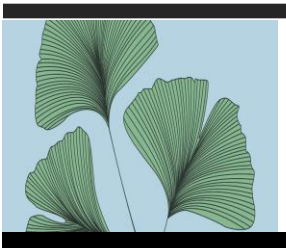

Valuing a Stock

Value would be higher if:

- Dividend were higher.
- Price of stock in one year were higher.
- Interest rate were lower.

If any of these changes, the current price of the stock will adjust.

If the company's outlook improves and anticipated sale price jumps to $84, then

$$(\text{Stock price})(1.06) = \$84 + \$1$$
$$(\text{Stock price}) = \$80.19.$$

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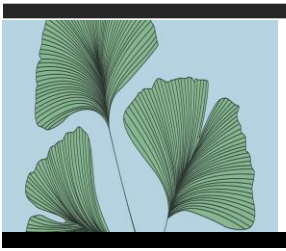

Risk Premium

Risk premium is the rate of return investors require to hold risky assets minus the rate of return on safe assets.

Suppose interest on a safe investment is 6%.

- FortuneCookie.com is risky, so 10% return is required.
- Stock will sell for $80 in 1 year; dividend will be $1

$$(\text{Stock price})\ (1.10) = \$81$$

$$\text{Stock price} = \$73.64.$$

Risk aversion increases the return required of a risky stock and lowers the selling price.

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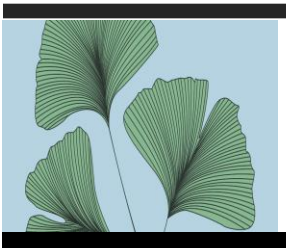

Bond Markets and Stock Markets

Channel funds from savers to borrowers with productive investment opportunities.

- Sale of *new* bonds or *new* stock can finance capital investment.

Like banks, bond and stock markets allocate saving.

- Provision of information on investment projects and their risks.
- Provide risk sharing and diversification across projects.
  - **Diversification** is spreading one's wealth over a variety of investments to reduce risk.

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Benefits of Diversification

Vikram has $1,000 to invest in stocks.

	Increase in Stock Price per Share	
Actual Weather	Smith Umbrella	Jones Suntan Lotion
Rainy (50%)	+10%	+0%
Sunny (50%)	+0%	+10%

Put all in one stock.

- 50% chance of 10% gain and 50% chance of zero.

Diversify and put half in each.

- One stock will gain 0% and the other gain 10%.
  - Return is 5% with no risk.

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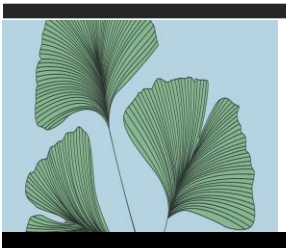

Stock and Bond Markets

Savers can put saving into a variety of financial assets.

- Diversification makes risky but potentially valuable projects possible.
  - No individual saver bears the whole risk.
  - Society is better off.

A **mutual fund** is a financial intermediary that sells shares in itself to the public, then uses the funds raised to buy a wide variety of financial assets.

- Diversified asset for the saver.
- Less costly than buying many stocks and bonds directly.

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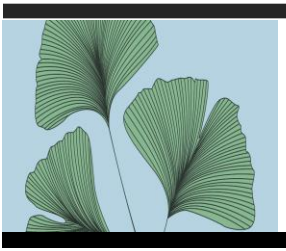

International Capital Flows 1

- Stock and bond markets are not only domestic.
- Many good investments are outside of the country.
- Investments flow between countries on **international financial markets**.

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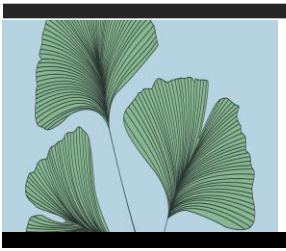

International Capital Flows 2

International capital flows are purchases or sales of real and financial assets across international borders.

- **Capital inflows** are purchases of domestic assets by foreign households and firms.
- **Capital outflows** are purchases of foreign assets by domestic households and firms.
- **Net capital inflows** (KI) are capital inflows minus capital outflows.

Capital flows are not counted as imports or exports since they refer to the purchase of existing assets rather than currently produced goods and services.

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Trade Balance

Trade balance is another name for **net exports** (*NX*).

- Value of a country's exports minus the value of its imports.

A **trade surplus** is a positive trade balance.

- Exports > imports.

A **trade deficit** is a negative trade balance.

- Imports > exports.

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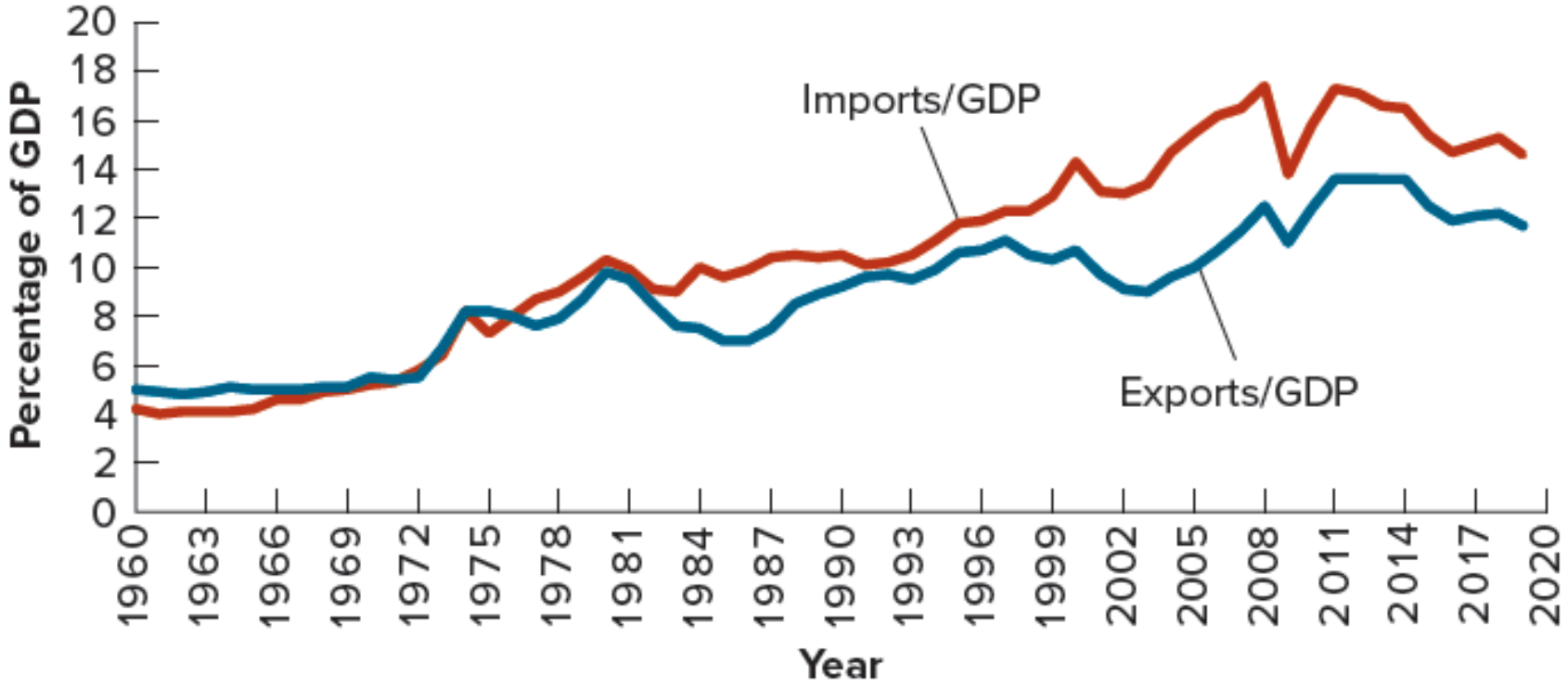
U.S. Trade Balance, 1960-2019



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Two Roles of International Capital Flows

Trade Imbalances

International capital flows compensate for trade imbalances.

- Trade surplus means net capital outflows.
- Trade deficit means net capital inflows.

Efficient Allocation of Savings

International capital flows allow savers to invest in the most profitable opportunities.

- Independent of location.

Fills savings gap in destination country.

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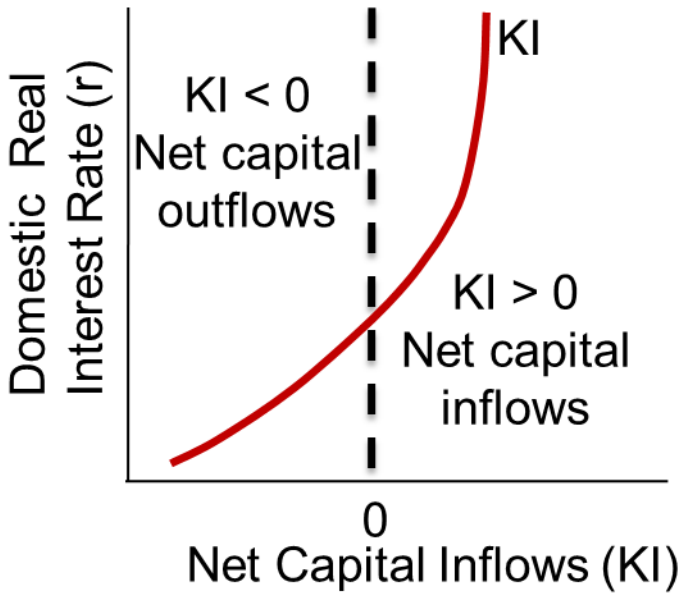
International Capital Flows 3

Capital inflows to the U.S. include foreign purchases of.

- Stocks and bonds of U.S. companies.
- U.S. government bonds.
- Real assets such as land and buildings owned by U.S. residents.

Capital flows respond to real interest rates.

- Higher domestic interest rates mean greater capital inflows.
- Money goes where returns are highest.



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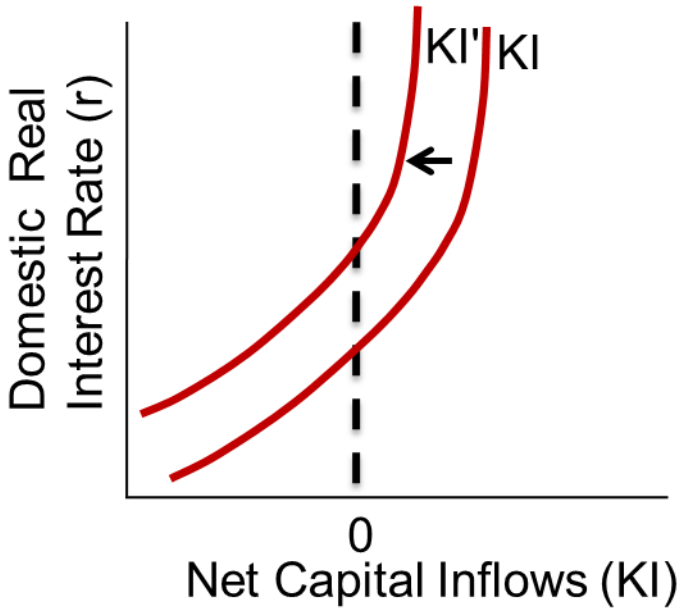
Risk and Capital Inflows

For a given real interest rate, increase in riskiness of domestic assets decreases capital inflows.

- Shifts the capital inflow curve to the left.
- Foreigners are less willing to buy domestic assets.
- Domestic savers are more willing to buy foreign assets.



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Trade Balance (NX) and Net Capital Inflows (KI)

$$NX + KI = 0$$

U.S. resident purchases Japanese car for $20,000.

- Imports = $20,000.

Manufacturer holds $20,000 in a U.S. bank account.

- Option 1: purchase $20,000 of U.S. goods and services so exports = $20,000.
- Option 2: purchase U.S. bonds or U.S. real estate.
  - *NX* = – $20,000, *KI* = $20,000.
- Option 3: sell dollars for yen.
  - Follow the dollars and see what the purchaser does with them to determine *NX* and *KI.*

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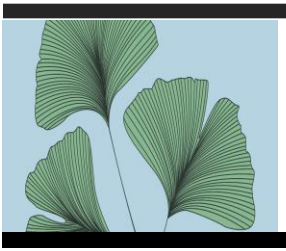

International Capital Flows 4

Highly developed financial markets allow borrowing and lending across borders.

Transactions are subject to laws in the originating country and the target country.

- Size of international flows for a country depend on its regulations and laws.
- Also depend on economic integration and political stability.

Lending is acquiring a real or financial asset.

- Buying a share of stock or a government bond or a parcel of land.

Borrowing is selling a real or financial asset.

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Savings, Investment, Capital Inflows

- Definition of output

$$Y = C + I + G + NX.$$

- Solve for I

$$Y - C - G - NX = I.$$

- National savings, S, is $(Y - C - G)$

$$S - NX = I.$$

- Also

$$NX + KI = 0 \quad \text{OR} \quad KI = -NX.$$

- So

$$\boldsymbol{S + KI = I.}$$

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S + KI = I

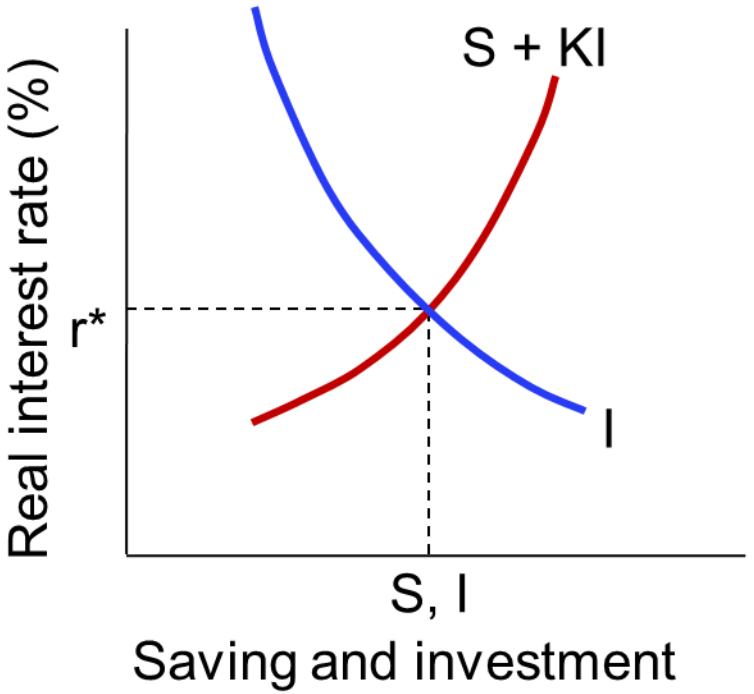
Savings plus net capital inflows equals investment in new capital goods.

- Foreign savings can supplement domestic savings to create capital goods to support economic growth.

In a closed economy, *S* = *I*.

- In an open economy, *S* + *KI* = *I*.

Capital inflows mean more investment and lower interest rates.



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The Saving Rate and the Trade Deficit 1

What causes trade deficits?

- Not the production of inferior goods.
- Not the result of unfair trade restrictions.
- A low rate of national saving is the primary cause.

Recall $S - I = NX$.

- Hold I fixed.
- High level of *S* implies a high level of *NX*.
- Low level of *S* implies a low level of *NX*.

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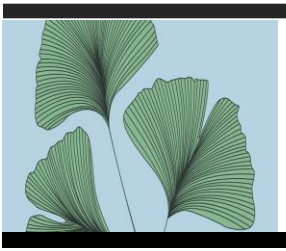

The Saving Rate and the Trade Deficit 2

Why is a low rate of national saving associated with a trade deficit?

- Low savings implies high spending.
- High spending includes more spent on imports.
- High domestic spending leaves less available for export.
- High imports and low exports.

Trade deficit country receives capital inflows.

- Lack sufficient saving to finance domestic investment.
- Interest rate will rise and attract capital inflows.

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The U.S. Trade Deficit

U.S. trade balanced until the mid 1970's.

Large deficits since the mid 1970's.

National saving has been less than investment since the mid 1970's.

Large government budget deficits, especially in the 1908's.

Decline in private saving in the 1990's as consumption spending surged.

- More spending on imports.

Large government budget deficits in the 2000's.

Trade deficits are not a problem as long as the economy continues to grow.

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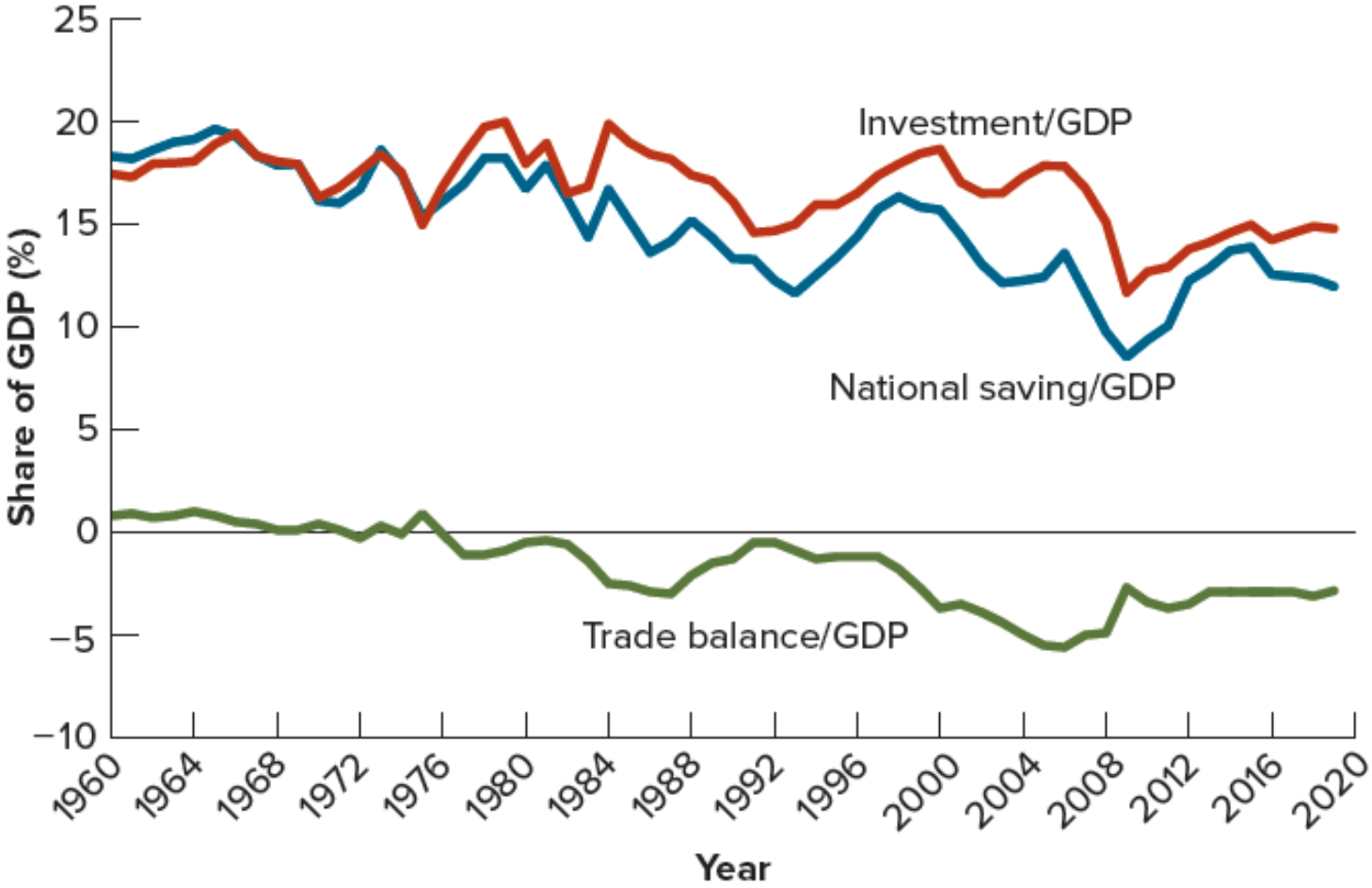
National Saving, Investment, and the Trade Balance in the U.S. 1960-2019



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